

```
In [14]: !pip install qiskit
```

```
Requirement already satisfied: qiskit in c:\Users\pc\Anaconda3\lib\site-packages (0.38.0)
Requirement already satisfied: qiskit-terra==0.21.2 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit) (0.21.2)
Requirement already satisfied: qiskit-aer==0.11.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit) (0.11.0)
Requirement already satisfied: qiskit-ibmq-provider==0.19.2 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit) (0.19.2)
Requirement already satisfied: numpy>=1.16.3 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-aer==0.11.0->qiskit) (1.21.5)
Requirement already satisfied: scipy>=1.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-aer==0.11.0->qiskit) (1.7.3)
Requirement already satisfied: requests>=2.19 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibmq-provider==0.19.2->qiskit) (2.27.1)
Requirement already satisfied: requests_ntlm>=1.1.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibmq-provider==0.19.2->qiskit) (1.1.0)
Requirement already satisfied: urllib3>=1.21.1 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibmq-provider==0.19.2->qiskit) (1.26.9)
Requirement already satisfied: python-dateutil>=2.8.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibmq-provider==0.19.2->qiskit) (2.8.2)
Requirement already satisfied: websocket-client>=1.0.1 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibmq-provider==0.19.2->qiskit) (1.4.1)
Requirement already satisfied: websockets>=10.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibmq-provider==0.19.2->qiskit) (10.3)
Requirement already satisfied: networkx>=0.11.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (0.11.0)
Requirement already satisfied: ply>=3.10 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (3.11)
Requirement already satisfied: psutil>=5 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (5.8.0)
Requirement already satisfied: sympy>=1.3 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (1.10.1)
Requirement already satisfied: dill>=0.3 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (0.3.5.1)
Requirement already satisfied: stevedore>=3.0.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (4.0.0)
Requirement already satisfied: tweedledum<2.0,>=1.1 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra==0.21.2->qiskit) (1.1.1)
Requirement already satisfied: six>=1.5 in c:\Users\pc\Anaconda3\lib\site-packages (from python-dateutil>=2.8.0->qiskit-ibmq-provider==0.19.2->qiskit) (1.16.0)
Requirement already satisfied: certifi>=2017.4.17 in c:\Users\pc\Anaconda3\lib\site-packages (from requests>=2.19->qiskit-ibmq-provider==0.19.2->qiskit) (2021.10.8)
Requirement already satisfied: charset-normalizer~2.0.0 in c:\Users\pc\Anaconda3\lib\site-packages (from requests>=2.19->qiskit-ibmq-provider==0.19.2->qiskit) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\Users\pc\Anaconda3\lib\site-packages (from requests>=2.19->qiskit-ibmq-provider==0.19.2->qiskit) (3.3)
Requirement already satisfied: ntlm-auth>=1.0.2 in c:\Users\pc\Anaconda3\lib\site-packages (from requests-ntlm>=1.1.0->qiskit-ibmq-provider==0.19.2->qiskit) (1.5.0)
Requirement already satisfied: cryptography>=1.3 in c:\Users\pc\Anaconda3\lib\site-packages (from requests-ntlm>=1.1.0->qiskit-ibmq-provider==0.19.2->qiskit) (3.4.8)
Requirement already satisfied: pbr!=2.1.0,>=2.0.0 in c:\Users\pc\Anaconda3\lib\site-packages (from stevedore>=3.0.0->qiskit-terra==0.21.2->qiskit) (5.10.0)
Requirement already satisfied: mpmath>=0.19 in c:\Users\pc\Anaconda3\lib\site-packages (from sympy>=1.3->qiskit-terra==0.21.2->qiskit) (1.2.1)
Requirement already satisfied: cffi>=1.12 in c:\Users\pc\Anaconda3\lib\site-packages (from cryptography>=1.3->requests-ntlm>=1.1.0->qiskit-ibmq-provider==0.19.2->qiskit) (1.15.0)
Requirement already satisfied: pycparser in c:\Users\pc\Anaconda3\lib\site-packages (from cffi>=1.12->cryptography>=1.3->requests-ntlm>=1.1.0->qiskit-ibmq-provider==0.19.2->qiskit) (2.21)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
```

```
[notice] A new release of pip is available: 23.1.2 -> 23.2.1
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
In [1]: !pip install qiskit-aer  
!pip install qiskit-visualization  
!pip install qiskit-ibm-provider  
!pip install imgaug==0.2.5  
!pip install pylatexenc
```

```
Requirement already satisfied: qiskit-aer in c:\users\pc\anaconda3\lib\site-packages (0.11.0)
```

```
Requirement already satisfied: numpy>=1.16.3 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-aer) (1.21.5)
```

```
Requirement already satisfied: qiskit-terra>=0.21.0 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-aer) (0.21.2)
```

```
Requirement already satisfied: scipy>=1.0 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-aer) (1.7.3)
```

```
Requirement already satisfied: networkx>=0.11.0 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (0.11.0)
```

```
Requirement already satisfied: ply>=3.10 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (3.11)
```

```
Requirement already satisfied: psutil>=5 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (5.8.0)
```

```
Requirement already satisfied: sympy>=1.3 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (1.10.1)
```

```
Requirement already satisfied: dill>=0.3 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (0.3.5.1)
```

```
Requirement already satisfied: python-dateutil>=2.8.0 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (2.8.2)
```

```
Requirement already satisfied: stevedore>=3.0.0 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (4.0.0)
```

```
Requirement already satisfied: tweedledum<2.0,>=1.1 in c:\users\pc\anaconda3\lib\site-packages (from qiskit-terra>=0.21.0->qiskit-aer) (1.1.1)
```

```
Requirement already satisfied: six>=1.5 in c:\users\pc\anaconda3\lib\site-packages (from python-dateutil>=2.8.0->qiskit-terra>=0.21.0->qiskit-aer) (1.16.0)
```

```
Requirement already satisfied: pbr!=2.1.0,>=2.0.0 in c:\users\pc\anaconda3\lib\site-packages (from stevedore>=3.0.0->qiskit-terra>=0.21.0->qiskit-aer) (5.10.0)
```

```
Requirement already satisfied: mpmath>=0.19 in c:\users\pc\anaconda3\lib\site-packages (from sympy>=1.3->qiskit-terra>=0.21.0->qiskit-aer) (1.2.1)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
```

```
[notice] A new release of pip is available: 23.1.2 -> 23.2.1
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
```

```
ERROR: Could not find a version that satisfies the requirement qiskit-visualization (from versions: none)
```

```
ERROR: No matching distribution found for qiskit-visualization
```

```
[notice] A new release of pip is available: 23.1.2 -> 23.2.1
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
Collecting qiskit-ibm-provider
```

```
  Using cached qiskit_ibm_provider-0.6.3-py3-none-any.whl (239 kB)
```

```
Collecting qiskit-terra>=0.25.0 (from qiskit-ibm-provider)
```

```
  Downloading qiskit_terra-0.25.1-cp38-abi3-win_amd64.whl (5.1 MB)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
WARNING: Ignoring invalid distribution -iskit-terra (c:\users\pc\anaconda3\lib\site-packages)
ERROR: Could not install packages due to an OSError: [WinError 5] 액세스가 거부되었습니다: 'C:\Users\pc\AppData\Local\Temp\pip-uninstall-tv2iyth\accelerate.cp39-win_amd64.pyd'
Consider using the '--user' option or check the permissions.
```

```
----- 5.1/5.1 MB 9.6 MB/s eta 0:00:00
Requirement already satisfied: requests>=2.19 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibm-provider) (2.27.1)
Requirement already satisfied: requests-ntlm>=1.1.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibm-provider) (1.1.0)
Requirement already satisfied: numpy>=1.13 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibm-provider) (1.21.5)
Requirement already satisfied: urllib3>=1.21.1 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibm-provider) (1.26.9)
Requirement already satisfied: python-dateutil>=2.8.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibm-provider) (2.8.2)
Collecting websocket-client>=1.5.1 (from qiskit-ibm-provider)
  Downloading websocket_client-1.6.2-py3-none-any.whl (57 kB)
----- 57.0/57.0 kB 3.1 MB/s eta 0:00:00
Requirement already satisfied: websockets>=10.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-ibm-provider) (10.3)
Collecting typing-extensions>=4.3 (from qiskit-ibm-provider)
  Downloading typing_extensions-4.7.1-py3-none-any.whl (33 kB)
Requirement already satisfied: six>=1.5 in c:\Users\pc\Anaconda3\lib\site-packages (from python-dateutil>=2.8.0->qiskit-ibm-provider) (1.16.0)
Requirement already satisfied: rustworkx>=0.13.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (0.13.0)
Requirement already satisfied: ply>=3.10 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (3.11)
Requirement already satisfied: psutil>=5 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (5.8.0)
Requirement already satisfied: scipy>=1.5 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (1.7.3)
Requirement already satisfied: sympy>=1.3 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (1.10.1)
Requirement already satisfied: dill>=0.3 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (0.3.5.1)
Requirement already satisfied: stevedore>=3.0.0 in c:\Users\pc\Anaconda3\lib\site-packages (from qiskit-terra>=0.25.0->qiskit-ibm-provider) (4.0.0)
Requirement already satisfied: certifi>=2017.4.17 in c:\Users\pc\Anaconda3\lib\site-packages (from requests>=2.19->qiskit-ibm-provider) (2021.10.8)
Requirement already satisfied: charset-normalizer~=2.0.0 in c:\Users\pc\Anaconda3\lib\site-packages (from requests>=2.19->qiskit-ibm-provider) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\Users\pc\Anaconda3\lib\site-packages (from requests>=2.19->qiskit-ibm-provider) (3.3)
Requirement already satisfied: nt lm-auth>=1.0.2 in c:\Users\pc\Anaconda3\lib\site-packages (from requests-ntlm>=1.1.0->qiskit-ibm-provider) (1.5.0)
Requirement already satisfied: cryptography>=1.3 in c:\Users\pc\Anaconda3\lib\site-packages (from requests-ntlm>=1.1.0->qiskit-ibm-provider) (3.4.8)
Requirement already satisfied: cffi>=1.12 in c:\Users\pc\Anaconda3\lib\site-packages (from cryptography>=1.3->requests-ntlm>=1.1.0->qiskit-ibm-provider) (1.15.0)
Requirement already satisfied: pbr!=2.1.0,>=2.0.0 in c:\Users\pc\Anaconda3\lib\site-packages (from stevedore>=3.0.0->qiskit-terra>=0.25.0->qiskit-ibm-provider) (5.10.0)
Requirement already satisfied: mpmath>=0.19 in c:\Users\pc\Anaconda3\lib\site-packages (from sympy>=1.3->qiskit-terra>=0.25.0->qiskit-ibm-provider) (1.2.1)
Requirement already satisfied: pyparser in c:\Users\pc\Anaconda3\lib\site-packages (from cffi>=1.12->cryptography>=1.3->requests-ntlm>=1.1.0->qiskit-ibm-provider) (2.21)
Installing collected packages: websocket-client, typing-extensions, qiskit-terra, qiskit-ibm-provider
  Attempting uninstall: websocket-client
    Found existing installation: websocket-client 1.4.1
    Uninstalling websocket-client-1.4.1:
      Successfully uninstalled websocket-client-1.4.1
  Attempting uninstall: typing-extensions
    Found existing installation: typing_extensions 4.1.1
    Uninstalling typing_extensions-4.1.1:
      Successfully uninstalled typing_extensions-4.1.1
  Attempting uninstall: qiskit-terra
```

```
Found existing installation: qiskit-terra 0.21.2
```

```
Uninstalling qiskit-terra-0.21.2:
```

```
  Successfully uninstalled qiskit-terra-0.21.2
```

```
[notice] A new release of pip is available: 23.1.2 -> 23.2.1
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
Collecting imgaug==0.2.5
```

```
WARNING: Ignoring invalid distribution - (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution - (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
[notice] A new release of pip is available: 23.1.2 -> 23.2.1
```

```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
  Downloading imgaug-0.2.5.tar.gz (562 kB)
```

```
----- 562.7/562.7 kB 5.1 MB/s eta 0:00:00
```

```
  Preparing metadata (setup.py): started
```

```
  Preparing metadata (setup.py): finished with status 'done'
```

```
Requirement already satisfied: scipy in c:\Users\Wpc\Anaconda3\lib\site-packages (from imgaug==0.2.5) (1.7.3)
```

```
Requirement already satisfied: scikit-image>=0.11.0 in c:\Users\Wpc\Anaconda3\lib\site-packages (from imgaug==0.2.5) (0.19.2)
```

```
Requirement already satisfied: numpy>=1.7.0 in c:\Users\Wpc\Anaconda3\lib\site-packages (from imgaug==0.2.5) (1.21.5)
```

```
Requirement already satisfied: six in c:\Users\Wpc\Anaconda3\lib\site-packages (from imgaug==0.2.5) (1.16.0)
```

```
Requirement already satisfied: networkx>=2.2 in c:\Users\Wpc\Anaconda3\lib\site-packages (from scikit-image>=0.11.0->imgaug==0.2.5) (2.7.1)
```

```
Requirement already satisfied: pillow!=7.1.0,!=7.1.1,!=8.3.0,>=6.1.0 in c:\Users\Wpc\Anaconda3\lib\site-packages (from scikit-image>=0.11.0->imgaug==0.2.5) (9.0.1)
```

```
Requirement already satisfied: imageio>=2.4.1 in c:\Users\Wpc\Anaconda3\lib\site-packages (from scikit-image>=0.11.0->imgaug==0.2.5) (2.9.0)
```

```
Requirement already satisfied: tifffile>=2019.7.26 in c:\Users\Wpc\Anaconda3\lib\site-packages (from scikit-image>=0.11.0->imgaug==0.2.5) (2021.7.2)
```

```
Requirement already satisfied: PyWavelets>=1.1.1 in c:\Users\Wpc\Anaconda3\lib\site-packages (from scikit-image>=0.11.0->imgaug==0.2.5) (1.3.0)
```

```
Requirement already satisfied: packaging>=20.0 in c:\Users\Wpc\Anaconda3\lib\site-packages (from scikit-image>=0.11.0->imgaug==0.2.5) (21.3)
```

```
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in c:\Users\Wpc\Anaconda3\lib\site-packages (from packaging>=20.0->scikit-image>=0.11.0->imgaug==0.2.5) (3.0.4)
```

```
Building wheels for collected packages: imgaug
```

```
  Building wheel for imgaug (setup.py): started
```

```
  Building wheel for imgaug (setup.py): finished with status 'done'
```

```
  Created wheel for imgaug: filename=imgaug-0.2.5-py3-none-any.whl size=561439 sha256=d9d6be54f62c6277ec38d80280e59f8e26b8792e0aa77fd87bedc16a4c55f643
```

```
  Stored in directory: c:\Users\Wpc\AppData\Local\pip\Cache\wheels\15\ce\73\56b66fd453b11dcfdbdb7bff1f4b2c1d448eba44f2212fb3d3b
```

```
Successfully built imgaug
```

```
Installing collected packages: imgaug
```

```
Successfully installed imgaug-0.2.5
```

```
Requirement already satisfied: pylatexenc in c:\Users\Wpc\Anaconda3\lib\site-packages (2.10)
```

```
WARNING: Ignoring invalid distribution - (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution -iskit-terra (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
WARNING: Ignoring invalid distribution - (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

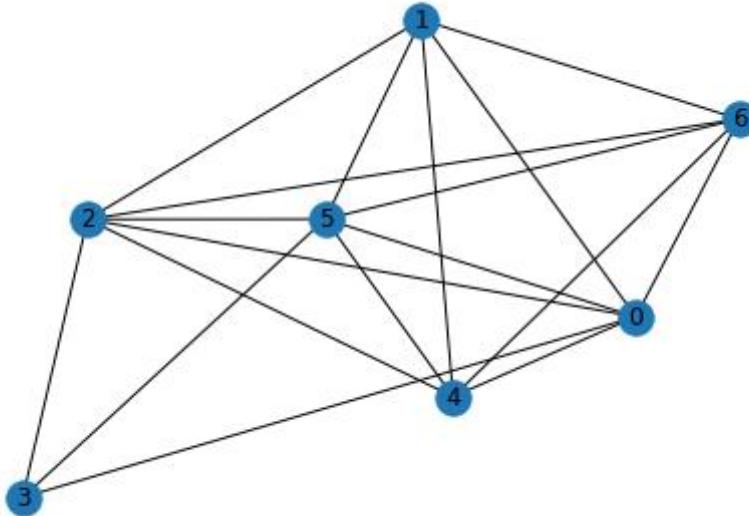
```
WARNING: Ignoring invalid distribution -iskit-terra (c:\Users\Wpc\Anaconda3\lib\site-packages)
```

```
[notice] A new release of pip is available: 23.1.2 -> 23.2.1
```

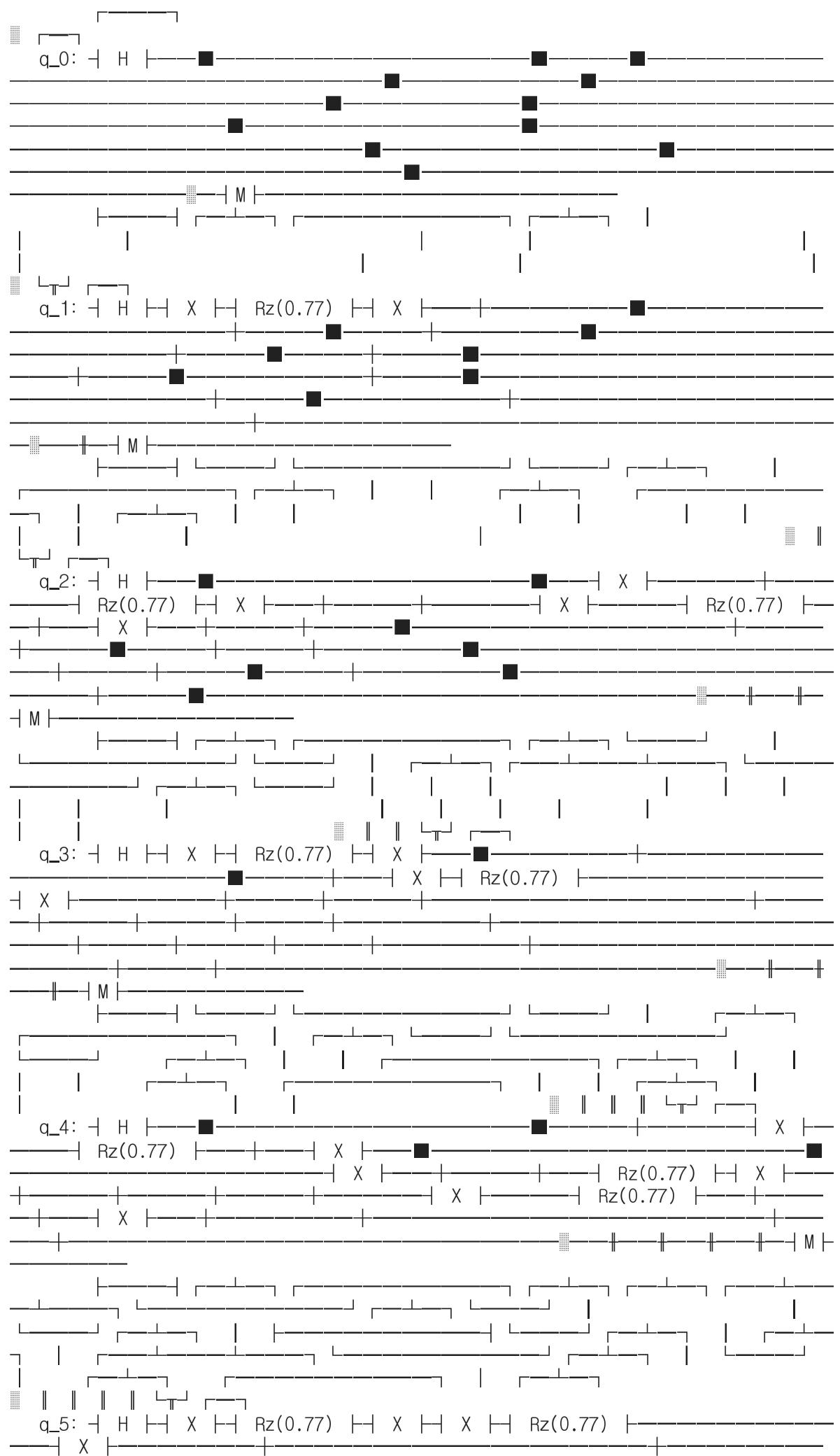
```
[notice] To update, run: python.exe -m pip install --upgrade pip
```

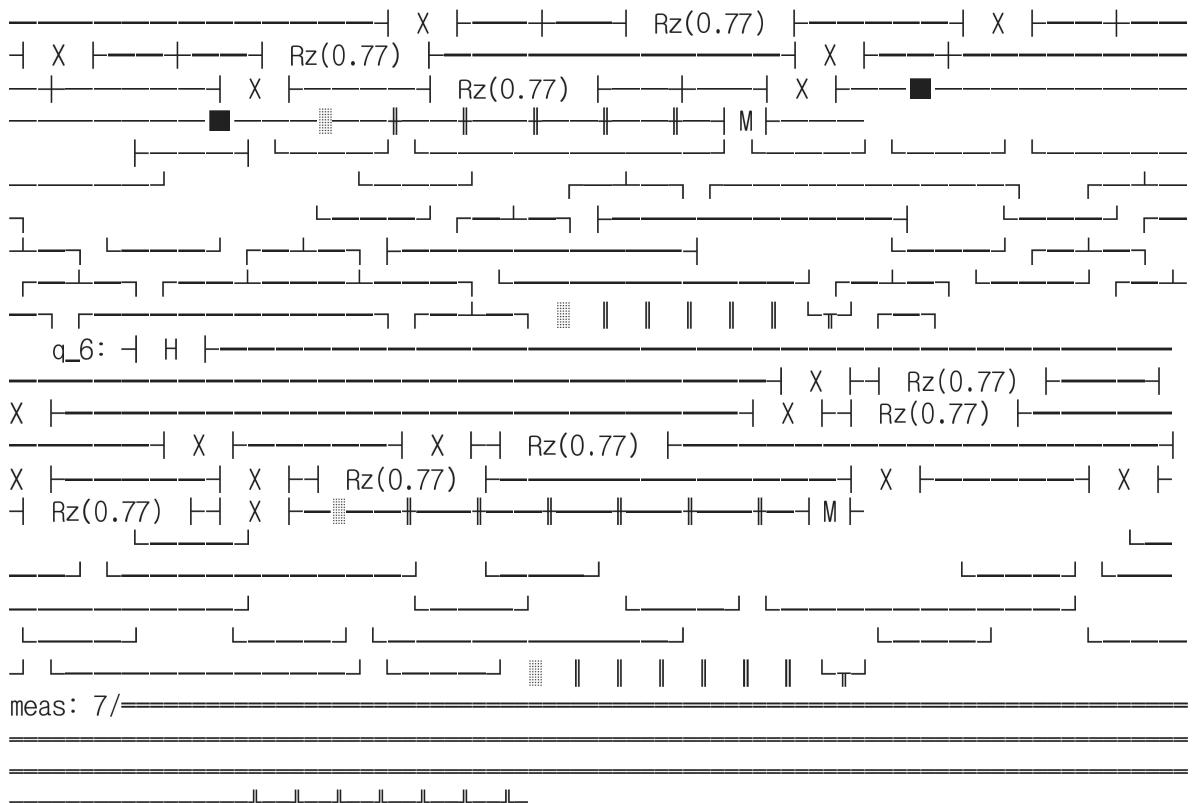
```
In [5]: from qiskit import *
import networkx as nx
from edge_coloring import EdgeColoring
from dfs import DFS
```

```
In [6]: G = nx.erdos_renyi_graph(7,0.7,seed=12)
nx.draw(G,with_labels=True)
```



```
In [8]: obj = EdgeColoring(G,0.77)
qc = obj.ec_ansatz(optimize=False,undo_gates=False)
print(qc.draw(fold=-1))
print("Depth of the circuit: ",qc.depth())
print("Number of CNOT gates: ",qc.count_ops()['cx'])
```





0 1 2 3 4 5 6

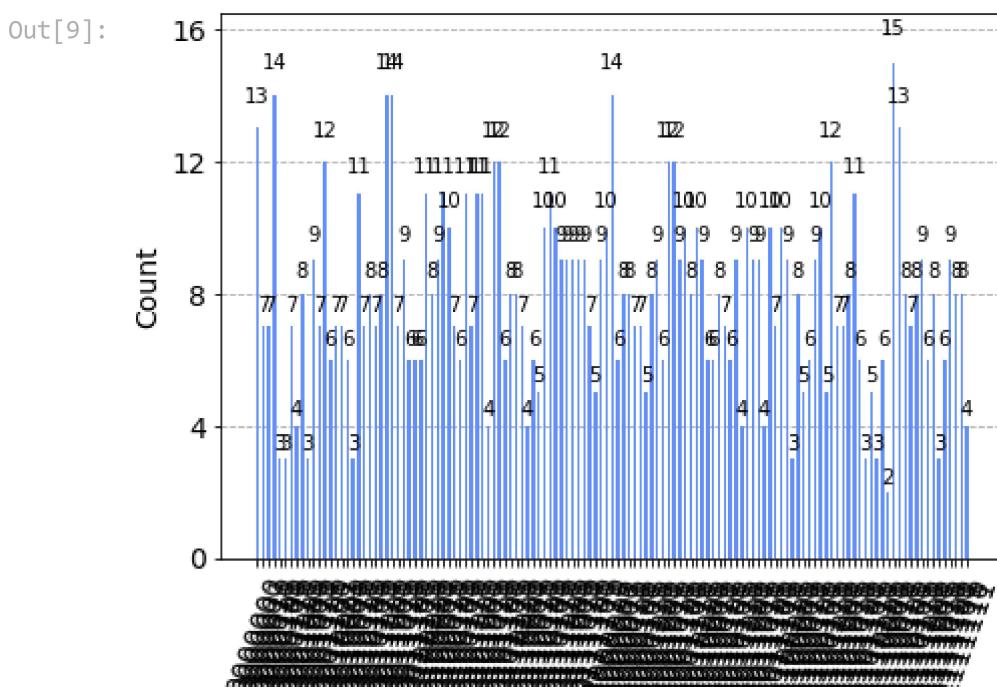
Depth of the circuit: 23

Number of CNOT gates: 36

```
In [9]: from qiskit import *
from qiskit.visualization import plot_histogram

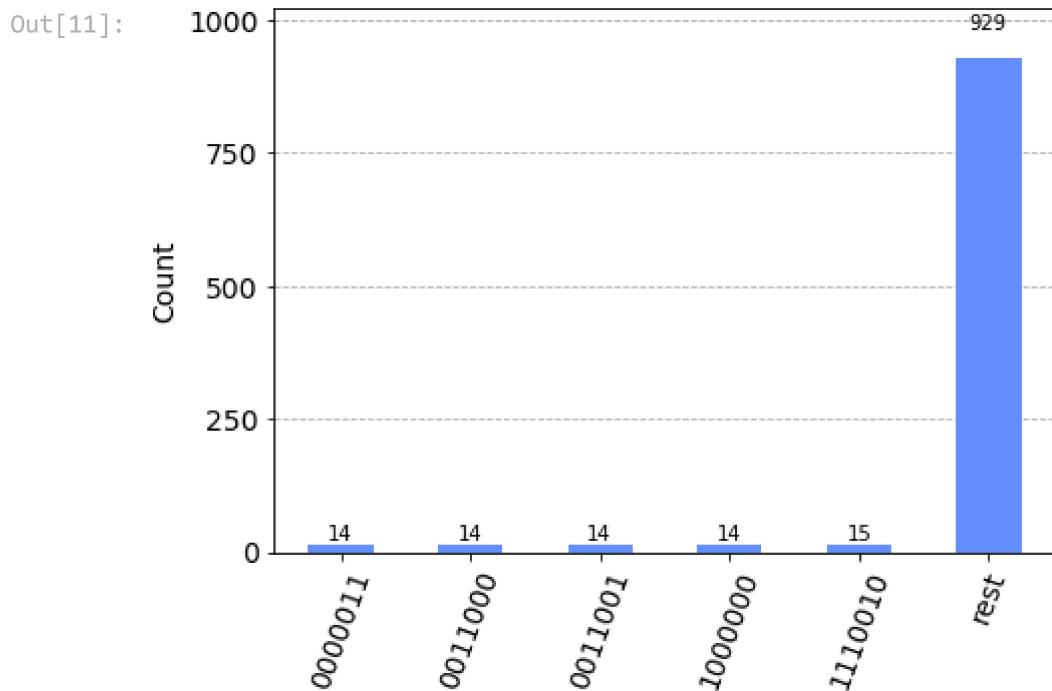
backend = BasicAer.get_backend('qasm_simulator')
result=backend.run(transpile(qc, backend), shots=1000).result()
counts = result.get_counts(qc)

plot_histogram(counts)
```



```
In [10]: import qiskit.visualization as qiskit_vis
```

```
In [11]: qiskit_vis.plot_histogram(counts, number_to_keep=5)
```



```
In [12]: from qiskit.quantum_info.analysis import hellinger_fidelity
from qiskit.providers.fake_provider import FakeManilaV2
from qiskit import QuantumCircuit, execute, BasicAer
from qiskit.providers.fake_provider import FakeLagosV2
```

Fake backend: noise_count , qasm_simulator: ideal_count

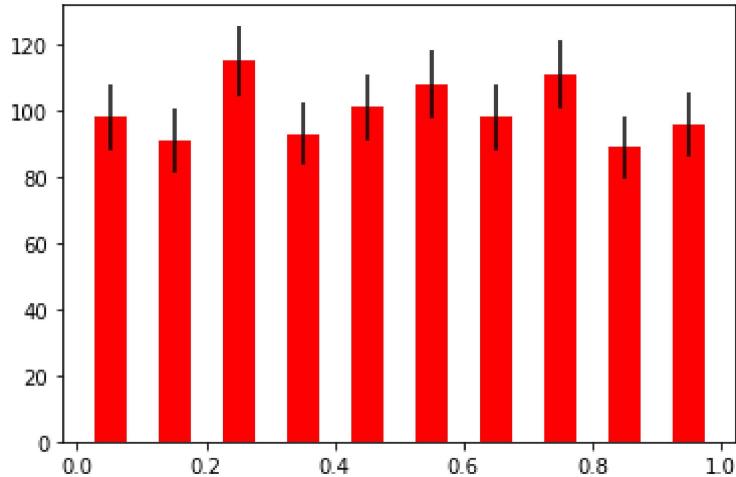
```
In [16]: backend = FakeLagosV2()
sim2 = BasicAer.get_backend('qasm_simulator')
res1 = execute qc, backend).result()
res2 = execute qc, sim2).result()

hellinger_fidelity(res2.get_counts(), res1.get_counts())
```

Out[16]: 0.9357027067392959

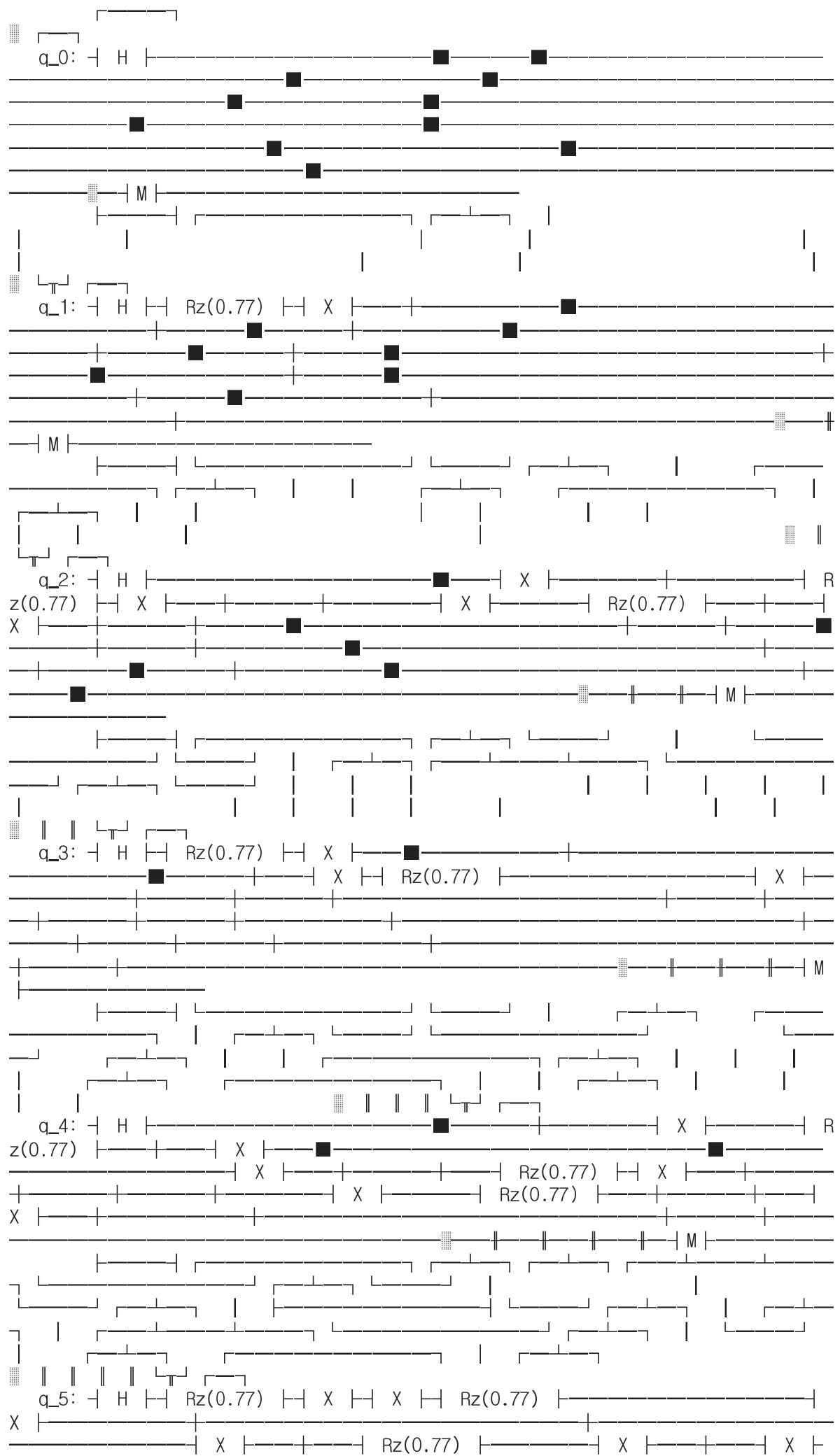
```
In [28]: import numpy as np
import pylab as plt

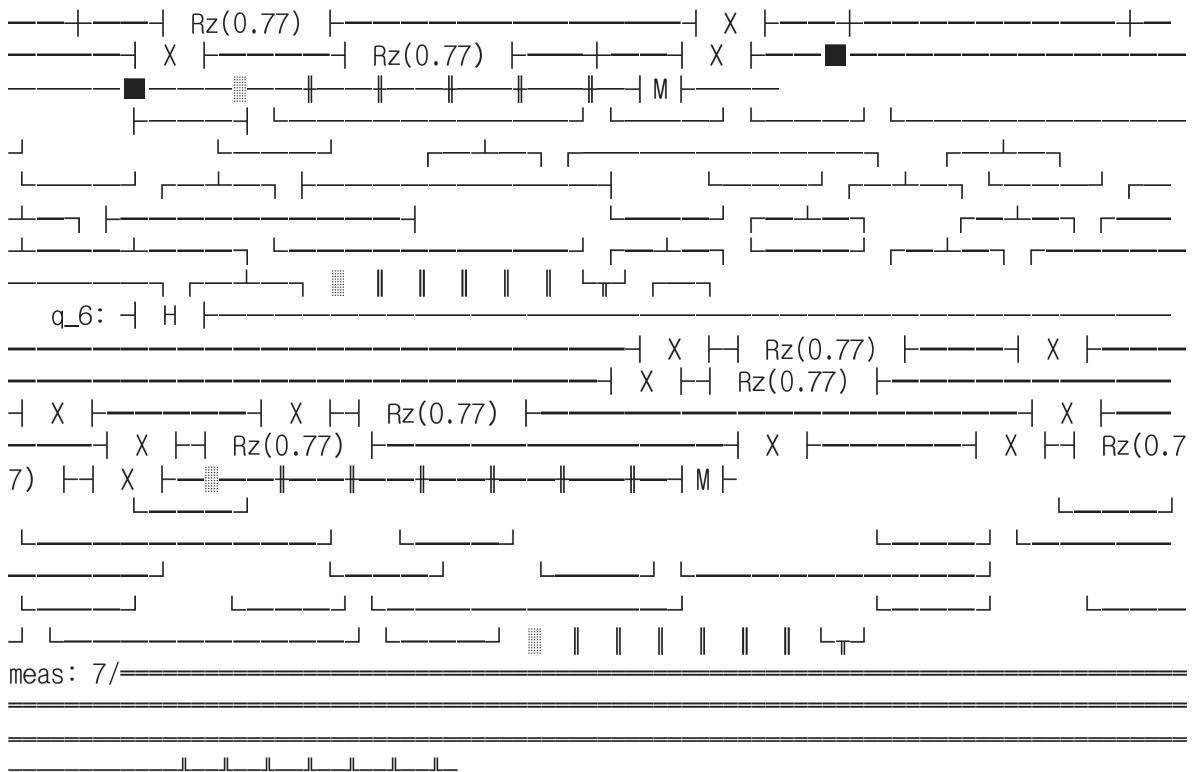
counts      = np.array(np.random.rand(1000))
y,binEdges = np.histogram(counts,bins=10)
bincenters = 0.5*(binEdges[1:]+binEdges[:-1])
menStd     = np.sqrt(y)
width      = 0.05
plt.bar(bincenters, y, width=width, color='r', yerr=menStd)
plt.show()
```



Edge coloring

```
In [17]: obj = EdgeColoring(G,0.77)
qc2 = obj.ec_ansatz(undo_gates=False)
print(qc2.draw(fold=-1))
print("Depth of the circuit: ",qc2.depth())
print("Number of CNOT gates: ",qc2.count_ops()['cx'])
```





0 1 2 3 4 5 6

Depth of the circuit: 22

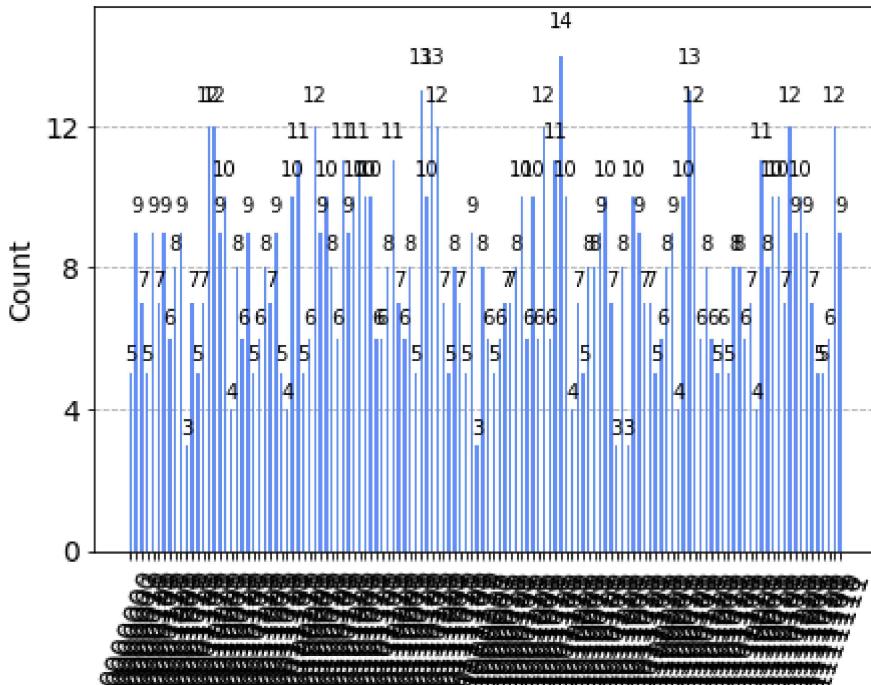
Number of CNOT gates: 33

```
In [18]: from qiskit import *
from qiskit.visualization import plot_histogram

backend = BasicAer.get_backend('qasm_simulator')
result=backend.run(transpile(qc2, backend), shots=1000).result()
counts2 = result.get_counts(qc2)

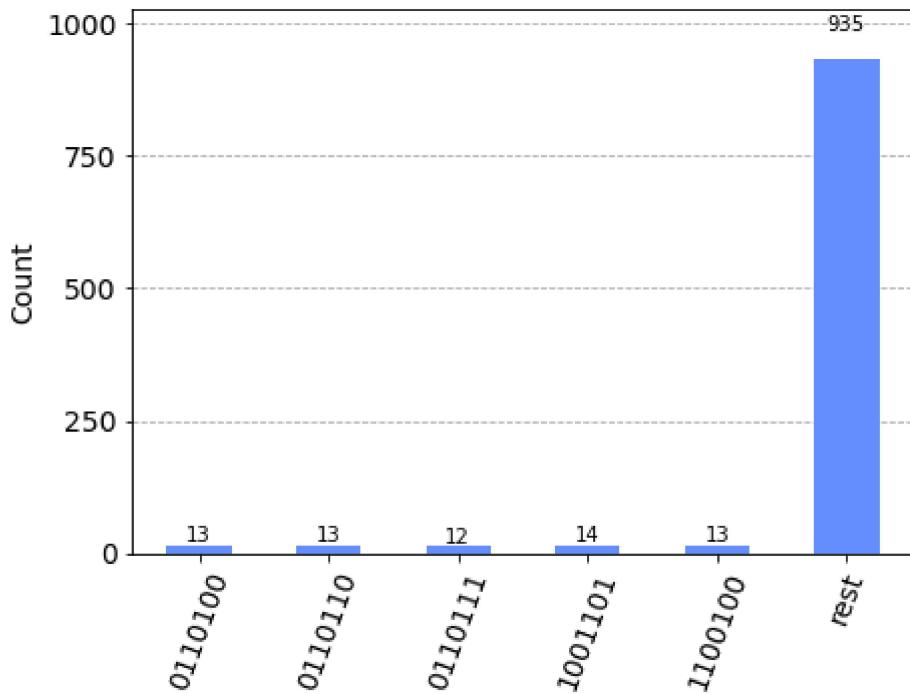
plot_histogram(counts2)
```

Out[18]:



```
In [19]: qiskit_vis.plot_histogram(counts2, number_to_keep=5)
```

Out[19]:



In [20]:

```
backend = FakeLagosV2()
sim2 = BasicAer.get_backend('qasm_simulator')
res3 = execute(qc2, backend).result()
res4 = execute(qc2, sim2).result()

hellinger_fidelity(res4.get_counts(), res3.get_counts())
```

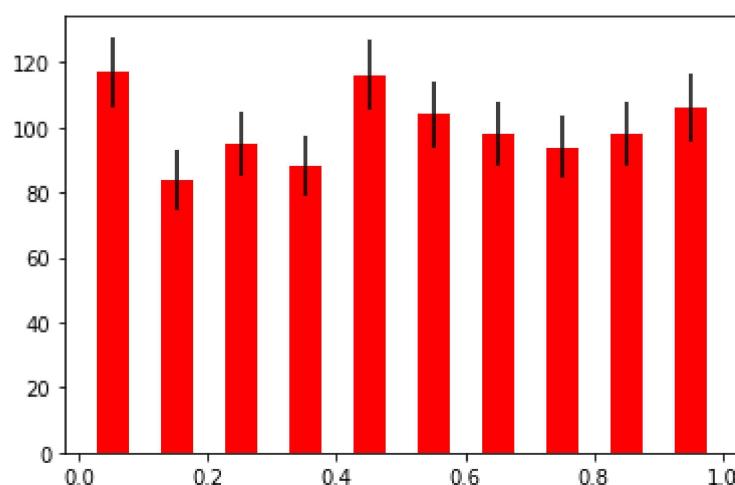
Out[20]:

0.9267383147327944

In [32]:

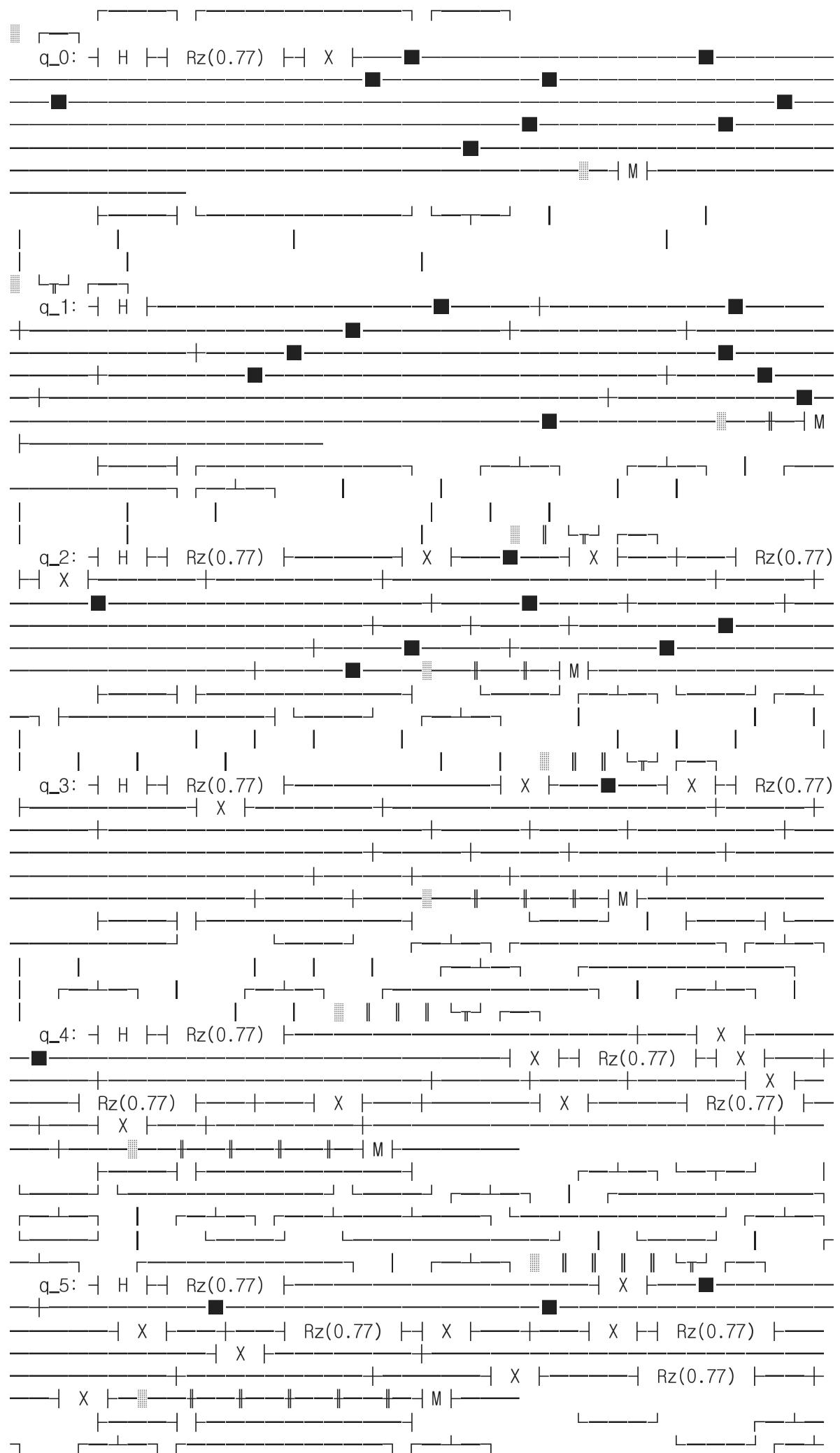
```
import numpy as np
import pylab as plt

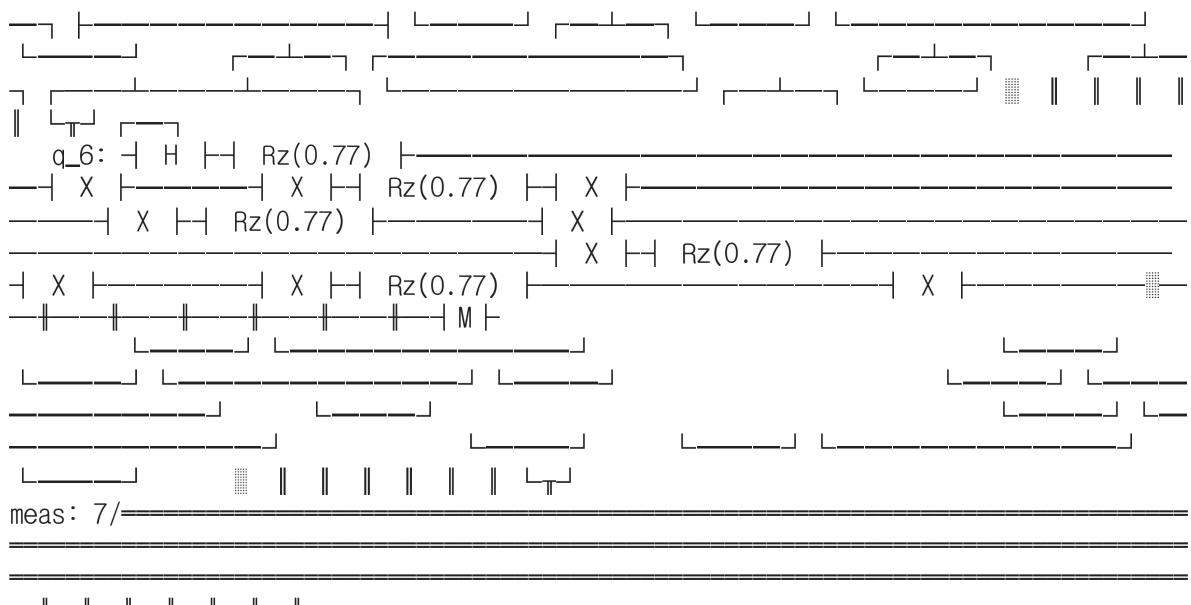
qc2      = np.array(np.random.rand(1000))
y,binEdges = np.histogram(qc2,bins=10)
bincenters = 0.5*(binEdges[1:]+binEdges[:-1])
menStd    = np.sqrt(y)
width     = 0.05
plt.bar(bincenters, y, width=width, color='r', yerr=menStd)
plt.show()
```



DFS

```
In [21]: obj = DFS(G,0.77,1)
qc3 = obj.dfs_ansatz(undo_gates=False)
print(qc3.draw(fold=-1))
print("Depth of the circuit: ",qc3.depth())
print("Number of CNOT gates: ",qc3.count_ops()['cx'])
```





0 1 2 3 4 5 6

Depth of the circuit: 24

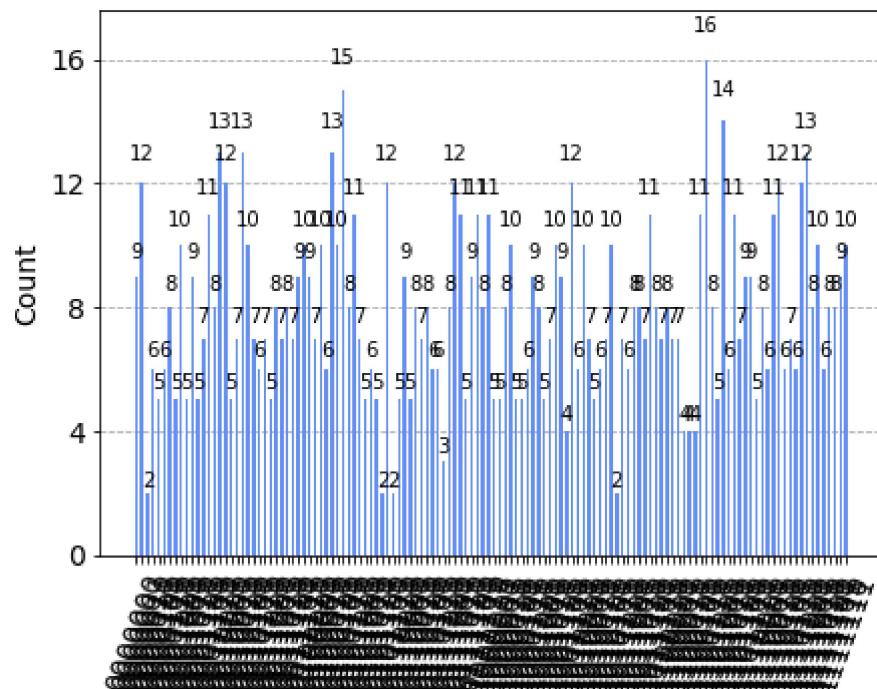
Number of CNOT gates: 30

```
In [22]: from qiskit import *
from qiskit.visualization import plot_histogram

backend = BasicAer.get_backend('qasm_simulator')
result = backend.run(transpile(qc3, backend), shots=1000).result()
counts3 = result.get_counts(qc3)

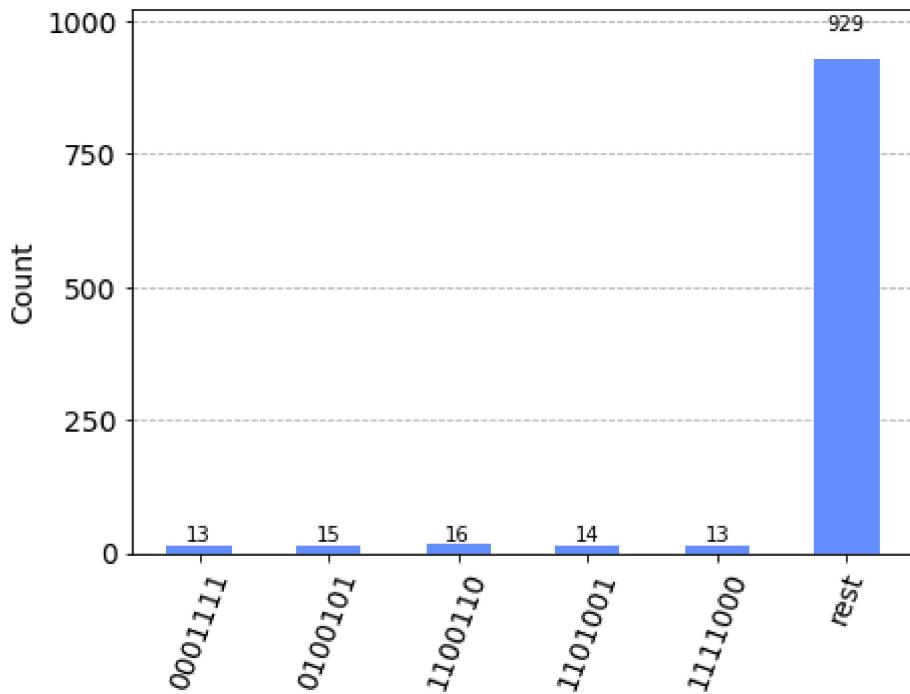
plot_histogram(counts3)
```

Out[22]:



In [23]: `qiskit_vis.plot_histogram(counts3, number_to_keep=5)`

Out[23]:



In [24]:

```
backend = FakeLagosV2()
sim2 = BasicAer.get_backend('qasm_simulator')
res5 = execute(qc3, backend).result()
res6 = execute(qc3, sim2).result()

hellinger_fidelity(res6.get_counts(), res5.get_counts())
```

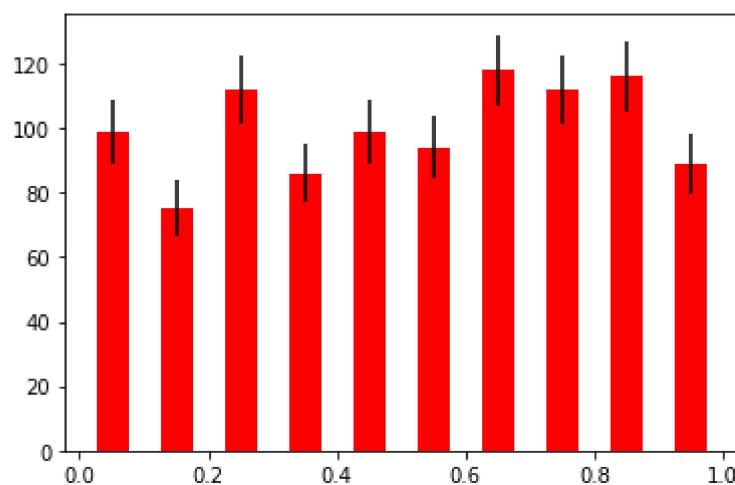
Out[24]:

0.9217147242807824

In [25]:

```
import numpy as np
import pylab as plt

qc3      = np.array(np.random.rand(1000))
y,binEdges = np.histogram(qc3,bins=10)
bincenters = 0.5*(binEdges[1:]+binEdges[:-1])
menStd    = np.sqrt(y)
width     = 0.05
plt.bar(bincenters, y, width=width, color='r', yerr=menStd)
plt.show()
```



In []: